List of benthic invertebrate samples collected by ROV Jason during R/V Thomas G. Thompson cruise TN391 in the western Atlantic margin and Gulf of Mexico in 2021

Website: https://www.bco-dmo.org/dataset/994794
Data Type: Cruise Results
Version: 1
Version Date: 2026-03-16

Project
» Collaborative Research: dispersal depth and the transport of deep-sea, methane-seep larvae around a biogeographic barrier (SALT)

Contributors	Affiliation	Role
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Abstract
List of benthic invertebrate samples collected by ROV Jason during the TN391 cruise to methane seeps in the Gulf of Mexico and the Northwestern Atlantic during May and June 2021. Samples were collected between the Western Atlantic margin and the Gulf of Mexico from Woods Hole to Gulfport, Mississippi, depth range 500 m-3300 m.

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Coverage

Location: Gulf of Mexico, Northwestern Atlantic
Spatial Extent: **N**:38.0481532 **E**:-73.82170566 **S**:26.02877105 **W**:-91.50825374
Temporal Extent: 2021-05-28 - 2021-06-16

Dataset Description

See the "Related Datasets" section for additional scientific sample lists, dive summaries, and related datasets from this cruise. Samples from this cruise include: benthic invertebrate samples collected by ROV Jason, plankton samples collected with the SyPRID sampler on Sentry, and water samples collected with niskin bottles

on the CTD carousel.

Methods & Sampling

Benthic animal samples were collected using scoops and slurps on ROV Jason (https://ndsf.whoi.edu/jason/systems-jason/). See dataset columns "Collection_Method" and "Biobox_slurp" for more details of the collection method used for each sample.

BCO-DMO Processing Description

Data submission included three separate sample lists supplied as separate sheets in the same excel file TN-391 Master Sample List.xlsx (each became a BCO-DMO dataset, see "Related Datasets").

Data file:
- Loaded data from "TN-391 Master Sample List.xlsx" (sheet: "Jason"), using row 2 as header, skipping row 1, treating "N/A" and empty strings as missing values; resource named "jason"
- Applied BCO-DMO field metadata (descriptions, standard name IDs, supplied units, primary parameter flags) to 17 fields including Sealog timestamp, Renav Latitude/Longitude/Depth, Dive #, Collection Method, and sample-related fields
- Renamed 13 columns to meet BCO-DMO naming conventions for interoperability (e.g., "Dive #" to "Dive_num", "Renav Latitude" to "Renav_Latitude", "# of containers" to "Num_containers", "Biobox/slurp" to "Biobox_slurp", etc.)
- Applied find/replace on Sealog_timestamp to remove non-standard whitespace characters (non-ASCII) from values
- Set field types: Renav_Latitude and Renav_Longitude as number; all other fields as string; Sealog_timestamp kept as string temporarily to allow format normalization
- Sealog_timestamp containted mixed formats (included milliseconds or just seconds resolution). Normalized Sealog_timestamp values lacking sub-second precision by appending ".000000" (.%f) to timestamps in the format YYYY-MM-DDTHH:MM:SSZ, standardizing all values to microsecond resolution for consistent format description using %S.%fZ. Noted in column description that it is precise to the millisecond (not microsecond).
- Appended "Z" to any Sealog_timestamp values not already ending in "Z" to have values as ISO 8601 datetime with timezone
- Set Sealog_timestamp type to datetime with format and output format "%Y-%m-%dT%H:%M:%S.%fZ"
- Renamed resource from "jason" to "994794_v1_tn391-benthic-invert-sample-list"
- Output written to "994794_v1_tn391-benthic-invert-sample-list.csv"

Metadata:
- Parameter (column) descriptions filled in from metadata provided for this data submission, and additional details filled in from context from Standard Jason Data products (see related methods reference about "Renav"). Definitions from related dive summary dataset also used to fill in definitions (see "Related Datasets").

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Related Publications

National Deep Submergence Facility (2026). Data Deliverables Summary for ROV Jason. Accessed March 19th, 2026 from https://ndsf.whoi.edu/data/data-deliverables-summary-for-rov-jason/ jason_data_deliverables_2026
Methods

National Deep Submergence Facility (2026). ROV Jason Systems, Sensors & Sampling Equipment. Accessed March 19th, 2026 from https://ndsf.whoi.edu/jason/systems-jason/
Methods

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Parameters

Parameter	Description	Units
Dive_num	Dive number (dive id)	unitless
Site	Site name	unitless
Sealog_timestamp	Sealog timestamp (datetime) in UTC time zone. Values with microseconds as .000000 are precise to the second only. All other values are precise to the millisecond.	unitless
Renav_Latitude	Latitude (from post-processed 'renavigation' data)	decimal degrees
Renav_Longitude	Longitude (from post-processed 'renavigation' data)	decimal degrees
Renav_Depth	Depth description (from post-processed 'renavigation' data). Includes individual depth measurement, description of range, or multiple depths.	meters (m)
Collection_Method	Collection method (e.g. ,Mussel Grab,, ,Sipuncollector,)	unitless
Biobox_slurp	Collection method during ROV Jason dive.	unitless
Sample_Description	Description of sample (e.g. 'sponges','rock','DNA','pooled','juvenile mussels')	unitless
Num_sampled_individuals	Number of sampled individuals	count (individuals)
Preservation	Preservation method	unitless
Container	Type of container	unitless
Num_containers	Number of containers	unitless
Container_Packaging	Description of container packaging	unitless
Recipient_of_Sample	Recipient of the sample (either WWU or OIMB)	unitless
Box_num	Box number	unitless
Notes	Additional notes	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	ROV Jason
Dataset-specific Description	See column in dataset "Collection_Method" for more details about how ROV Jason obtained samples. More information can be found about Jason Samplers at https://ndsf.whoi.edu/jason/systems-jason/.
Generic Instrument Description	The Remotely Operated Vehicle (ROV) Jason is operated by the Deep Submergence Laboratory (DSL) at Woods Hole Oceanographic Institution (WHOI). WHOI engineers and scientists designed and built the ROV Jason to give scientists access to the seafloor that didn't require them leaving the deck of the ship. Jason is a two-body ROV system. A 10-kilometer (6-mile) fiber-optic cable delivers electrical power and commands from the ship through Medea and down to Jason, which then returns data and live video imagery. Medea serves as a shock absorber, buffering Jason from the movements of the ship, while providing lighting and a bird's eye view of the ROV during seafloor operations. During each dive (deployment of the ROV), Jason pilots and scientists work from a control room on the ship to monitor Jason's instruments and video while maneuvering the vehicle and optionally performing a variety of sampling activities. Jason is equipped with sonar imagers, water samplers, video and still cameras, and lighting gear. Jason's manipulator arms collect samples of rock, sediment, or marine life and place them in the vehicle's basket or on "elevator" platforms that float heavier loads to the surface. More information is available from the operator site at URL. https://ndsf.whoi.edu/jason/

Dataset-specific Instrument Name	
Generic Instrument Name	ROV Jason Bio Boxes
Generic Instrument Description	Biological Sample Collection Boxes (Bio Boxes) (from https://ndsf.whoi.edu/jason/systems-jason/) Jason's standard biological sample boxes are constructed of 1″ thick HDPE plastic and have a fully-hinged lid with a polyurethane tube seal. These boxes provide a reasonable measure of insulation and sample integrity. They are best used for robust samples as some mixing may occur during transit. These boxes fit nicely on Jason's swing-arms. Available sizes: Standard – 12″ x 12″ x 12″, 5 available Large – 30″ x 12″ x 12″, 2 available (can be half-sectioned via a removable central divider)

Dataset-specific Instrument Name	
Generic Instrument Name	ROV Jason Slurp Samplers
Generic Instrument Description	From: https://ndsf.whoi.edu/jason/systems-jason/ Slurp Samplers The slurp samplers consist of a collection chamber and a hydraulically powered water pump. A nozzle with a tube connected to it is held and moved by a manipulator while water is pulled into the nozzle by the pump. The water travels down the tube into the collection chamber, and then goes through a mesh screen before going through the pump itself. Biological samples are sucked into the nozzle and deposited in the collection chamber. They are kept from going into the pump by the mesh screen. The screen can be changed for coarser or finer mesh as needed. Two styles of collection chamber are available; large Single Chamber and 5-Chamber. Single Chamber: A large cylindrical single collection chamber into which all samples will be deposited. 5-Chamber: 5 separate cylindrical collection chambers of 4.5 inch ID x 11.5 inch height. One chamber is used at a time, and the chambers are rotated into place to be used by a hydraulic actuator mounted to the bottom of the 5-Chamber assembly.

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Deployments

TN391

Website	https://www.bco-dmo.org/deployment/893731
Platform	R/V Thomas G. Thompson
Start Date	2021-05-25
End Date	2021-06-20
Description	See more information at R2R: https://www.rvdata.us/search/cruise/TN391 During the TN391 cruise, we conducted 14 dives with the ROV Jason to collect animal specimens from the seafloor and to recover/redeploy Seep Larval Observatories (SLOs) from each sample site. We also had 12 dives with the AUV Sentry to use the SyPRID plankton sampler. Additionally, five CTD casts were conducted during the duration of the cruise.

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Project Information

Collaborative Research: dispersal depth and the transport of deep-sea, methane-seep larvae around a biogeographic barrier (SALT)

Website: https://wp.wwu.edu/arellanolab/category/salt/

Coverage: Methane seeps on the shelf and slope of Louisiana, Mississippi, Florida, North Carolina, Virginia and Maryland

NSF Award Abstract:
Ever since hydrothermal vents and methane seeps were first discovered in the deep ocean more than 40 years ago, scientists have wondered how these isolated communities, fully dependent on underwater "islands" of toxic chemicals, are first colonized by organisms, and how the populations of these specialized animals are exchanged and maintained. These fundamental processes depend on the transport of babies (larvae) by the ocean currents, yet because the larvae are microscopic and diluted in the vastness of the ocean, it is very

difficult to determine where and how they drift. This project uses an autonomous underwater vehicle to collect larvae from precise regions of the water column. Larval traps on the bottom and chemical analyses of larval shells will also be used to determine the depths where larvae swim. These findings will provide realistic estimates for mathematical models that show how biology interacts with ocean currents to predict which methane seeps will be colonized by larvae originating at different depths. A detailed knowledge of larval dispersal is needed for conservation and management of the deep sea. Without such information, we cannot know the best placement of marine protected areas, nor can we facilitate the reestablishment of communities impacted by deep-sea mining, drilling, or other human activities. This project will provide hands-on at-sea training for college students to learn the rapidly vanishing skills needed for studies of larvae and embryos in their natural habitats. Learning opportunities will also be available to individuals of all ages through new, interactive exhibits on deep-sea biology and larval ecology produced for small museums and aquaria on the coasts of Oregon, Washington and North Carolina.

Reliable estimates of connectivity among metapopulations are increasingly important in marine conservation biology, ecology and phylogeography, yet biological parameters for biophysical models in the deep sea remain largely unavailable. The movements of deep-sea vent and seep larvae among islands of habitat suitable for chemosynthesis have been inferred from current patterns using numerical modeling, but virtually all such models have used untested assumptions about biological parameters that should have large impacts on the predictions. This project seeks to fill in the missing biological parameters while developing better models for predicting the dispersal patterns of methane seep animals living in the Gulf of Mexico and on the Western Atlantic Margin. Despite the existence of similar seeps at similar depths on two sides of the Florida peninsula, the Western Atlantic seeps support only a subset of the species found in the Gulf of Mexico. It is hypothesized that the ability of larvae to disperse through the relatively shallow waters of the Florida Straits depends on an interaction between the adult spawning depth and the dispersal depth of the larvae. Dispersal depth, in turn, will be influenced by larval flotation rates, swimming behaviors, feeding requirements, and ontogenetic migration patterns during the planktonic period. The recently developed SyPRID sampler deployed on AUV Sentry will be used to collect larvae from precise depth strata in the water column, including layers very near the ocean floor. Larval traps deployed on the bottom at three depths in each region will be used in conjunction with the plankton collections to determine what proportion of larvae are demersal. Comparisons of stable oxygen isotopes between larval and juvenile mollusk shells will provide information on the temperatures (and therefore depths) that larvae develop, and geochemical analyses of larval and juvenile shells will determine whether larval cohorts mix among depth strata. Ocean circulation and particle transport modeling incorporating realistic biological parameters will be used to predict the movements of larvae around the Florida Peninsula for various spawning depths and seasons.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1851383
NSF Division of Ocean Sciences (NSF OCE)	OCE-1851286
NSF Division of Ocean Sciences (NSF OCE)	OCE-1851421

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